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4 October 1985

Worldwide Report

# NUCLEAR DEVELOPMENT AND PROLIFERATION

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# WORLDWIDE REPORT

## NUCLEAR DEVELOPMENT AND PROLIFERATION

## CONTENTS

## SUB-SAHARAN AFRICA



## WEST EUROPE

JAPAN URGES PRC, FRANCE SIGN NUCLEAR ARMS TREATY

OW300031 Tokyo KYODO in English 0002 GMT 30 Aug 85

[Text] Geneva, 29 Aug KYODO -- Japanese Ambassador Ryukichi Imai called on China and France, both nuclear-weapons states, Thursday to sign the Nuclear Nonproliferation Treaty (NPT) to promote nuclear disarmament.

In an address before the third review conference of parties to the NPT, he also expressed the hope that the United States and the Soviet Union would take "realistic and concrete measures" for sharp cut and eventual abolition of nuclear weapons through their arms control and disarmament talks.

Voicing Japanese concern about the Soviet SS-20 missiles deployed in the Far East, Imai urged the two superpowers to find "a global solution" for Asian peace and security. Imai's speech came on the third day of the Geneva conference which opened Tuesday for a month-long run. "My country very strongly hopes that both China and France will find the earliest opportune moment to adhere to the present treaty," the Japanese ambassador told the conference.

Three other nuclear weapons states, the United States, the Soviet Union and Britain, are among 130 countries which are parties to the NPT.

Japan concluded a nuclear power cooperation agreement with China in Tokyo last month after obtaining Chinese assurance of peaceful use of nuclear energy. The U.S. Congress has yet to approve a similar nuclear agreement between Washington and Beijing.

Ambassador Imai said that the NPT regime consists of three main pillars of prevention of nuclear proliferation, right to peaceful uses of nuclear energy and nuclear disarmament.

Nuclear power, accounting for 3 to 4 percent of the world's energy needs, "as a form of energy technology has entered an era of maturity and has been settling down to seek its proper share in the entire energy spectrum of the next century," he remarked. But as for nuclear disarmament, Imai said, the present situation is "disappointing and is becoming a cause of considerable frustration to all concerned."

The Japanese delegate suggested a step-by-step approach to a comprehensive nuclear test ban, originally proposed by foreign Minister Shintaro Abe during

the disarmament conference in June, 1984, as "a pragmatic and readily available" one to achieve nuclear disarmament by nuclear-weapons countries.

Imai said that Japan, which ratified the NPT in 1976, will never produce or possess nuclear weapons. The Japanese cities of Hiroshima and Nagasaki were A-bombed on August 6 and 9, 1945. "This belief has not changed in any way up to the present time," the Japanese ambassador said. "In other words, the maintenance of the NPT regime is a matter of national interest to Japan, and we shall do our utmost to maintain and strengthen this regime."

Japan, along with Canada, West Germany and a number of other Western European countries, are treaty countries with highly advanced nuclear capabilities.

CSO: 5260/025

**JAPANESE DELEGATES CHOSEN FOR NUCLEAR TREATY REVIEW**

**OW200138 Tokyo KYODO in English 0134 GMT 20 Aug 85**

[Text] Tokyo, Aug. 20 KYODO -- The cabinet Tuesday chose the leaders of the Japanese delegation to the third review session of the Nuclear Non-Proliferation Treaty (NPT), which opens in Geneva August 27, officials said.

The two leaders will be Ryukichi Imai, ambassador to the Japanese mission of the United Nations Disarmament Commission, and Yoshifumi Matsuda, director general for scientific and technological affairs.

High on the agenda at the four-week session are ways of preventing the proliferation of nuclear weapons, nuclear disarmament and the peaceful utilization of nuclear power. Japan has been invited to the international meeting as one of the 128 countries which have signed the treaty.

**CSO: 5260/021**

JAPAN

## ASAHI SHIMBUN CRITICISM OF FRENCH NUCLEAR POLICY CITED

HK201518 Hong Kong AFP in English 1424 GMT 20 Aug 85

[Text] Tokyo, Aug 20 (AFP) -- The large-circulation Japanese daily, ASAHI SHIMBUN, today attacked French nuclear policy as "thoughtless", amid allegations that the French secret service was involved in the sinking of the Greenpeace ship Rainbow Warrior last month.

The paper, known for its pacifist views, criticized France's insistence on continuing its nuclear testing in the South Pacific as well what is called its "active support for arms sales to ease the country's financial difficulties". "This policy is thoughtless: The end must not necessarily justify the means," the paper said.

It said French sovereignty should be respected around the Mururoa Atoll, the Pacific testing site where the sunken Greenpeace vessel, the Rainbow Warrior, was to have led a protest flotilla. But it asked: "Does (French) President (Francois) Mitterrand really think that France can do anything it wants on this atoll, despite growing international criticism?"

The Rainbow Warrior was mined in Auckland Harbor on July 10, killing a Portuguese photographer. President Mitterrand has ordered an enquiry into press reports in Paris that the French secret service was involved in the operation.

CSO: 5160/024

TURKEY SIGNS LETTER OF INTENT FOR CANDU PLANT DEAL

Ottawa THE CITIZEN in English 15 Aug 85 p A4

[Text] Atomic Energy of Canada Ltd. has signed a letter of intent with the Turkish government for the $1-billion sale of a Candu nuclear power station, its first reactor sale since 1979.

But before the deal comes off the federal government must decide on financing the unique proposal the Turks have made.

AECL, a federal Crown corporation, signed an agreement Wednesday with the Turkish government and the Turkish electrical authority to build a 665-megawatt power station on the Mediterranean coast at Akkuyu.

If it goes ahead, the project would create about 45,000 person-years of employment in Canada, AECL spokesman Denis St. Jean said.

But one government insider said the agreement merely formalizes Turkey's desire to buy the Candu. "It's not earthshaking, but it ties things down a little more."

The Turks took advantage of the weak market for nuclear reactors and successfully pressed in negotiations during the past year to have the successful bidder own and operate the power station.

AECL has agreed it would own the station for 15 years and recoup its investment by selling power to the Turkish electrical authority.

To handle the project, AECL has set up a consortium with NEI Parsons of Britain and Enka Insaat, a Turkish construction company, as partners. The consortium would own 60 per cent of the plant and TEK, the Turkish electrical utility, would own the rest.

Two financing options are available to the government, although AECL has yet to recommend either one.

The government could finance the deal through the Export Development Corp., guaranteeing the loans the EDC would make to cover the costs of building the plant.

Alternatively, the consortium could raise the money on its own and then ask the government to insure the project against the risks inherent in owning a $1-billion power station in a country governed by a military dictatorship.

Whether the government would agree to underwrite such an expensive risk and allow one of its corporations to own a nuclear plant in a foreign country is an open question.

On the other hand, the government will have to weigh that risk against the jobs that would be created.

The deal with Turkey might help AECL sell a reactor to Egypt, the president of the Egypt-Canada Business Council said in Montreal.

"It certainly adds credibility to the Candu system" Lambert Toupin said.

Egypt wants to build eight reactors, two at a time. AECL will be one of the bidders for the second phase.

The beleaguered Crown corporation has not sold a Candu reactor since a billion-dollar deal with Romania in 1979.

Feeling the effects of a worldwide slump in the nuclear industry, AECL announced the elimination of more than 500 jobs earlier this year from its Candu nuclear reactor division.

Industry Minister Sinclair Stevens told reporters he hopes the sale will give the troubled nuclear industry "a bit of a lift."

"That industry has had some very very severe years and I think they do need not just one, but three or four good projects that hopefully will get them back into the mainstream of an active, prospering industry.

"Canada at one time had a good lead in this field. I think it's too bad they haven't had a better five or 10 years over the recent past and anything that would reinvigorate them and get them back to a more prosperous state should be encouraged."

The minister refused to comment on the prospects of negotiating a financial package, but said "anything that would help the industry will certainly get very very favorable review as far the government is concerned."

CSO: 5120/23

CANADA

U.S. SHIP CAUSES CONCERN IN TORONTO NUCLEAR-FREE ZONE

Windsor THE SATURDAY WINDSOR STAR in English 10 Aug 85 p 2

[Text]

TORONTO (CP) — Disarmament groups are concerned that a United States warship moored at the city's docks this weekend might be carrying nuclear weapons and contravening Toronto's status as a nuclear-free zone.

"In 1983 Mayor (Art) Eggleton declared Toronto is a nuclear weapons free zone and any warship should give assurances that it isn't carrying nuclear weapons," said Steve Shallhorn, spokesman for the Toronto Disarmament Network. "The response from (the frigate U.S.S. Stark) has been that they 'neither confirm nor deny' the presence of nuclear weapons and that's just not good enough."

IN A letter delivered Friday, Shallhorn told Cmdr. Glenn R. Brindel about Toronto's declaration against nuclear weapons.

"We must inform you that unless you can categorically deny that the U.S.S. Stark is not carrying nuclear weapons, your ship is not welcome in the City of Toronto," he said in the letter.

Lieut-Cmdr. Rick Wright of the U.S. Navy said it is U.S. policy not to divulge the whereabouts of nuclear weapons, but he admitted the U.S.S. Stark was capable of carrying nuclear warheads.

TORONTO Alderman Richard Gilbert said a U.S. Navy brochure available on the U.S.S. Stark notes that one of its armaments is the Harpoon anti-missile system — which is listed as a nuclear weapon in the U.S.-based Nuclear Weapons Databook.

However, Toronto Mayor Art Eggleton said: "I've spoken with the U.S. consul general's office and with the Canadian ministry of national defence. I have talked to other people and I don't believe there are any nuclear weapons on board."

CSO: 5120/23

CANADA

BAR ASSOCIATION PRESIDENT CALLS FOR NUCLEAR ARMS BAN

Toronto THE GLOBE AND MAIL in English 23 Jul 85 p 3

[Article by Marina Strauss]

[Text] Nuclear weapons should be declared illegal and banned through international agreement, the president of the Canadian Bar Association has told an international law conference.

The weapons are to all intents and purposes illegal because they are capable of destroying everyone, Claude Thomson said in a keynote address at the 12th Conference on the Law of the World in West Berlin.

"As a realist, I do not plead for a unilateral or unreciprocated disarmament," Mr. Thomson said. "As a humanitarian, I appeal ... for the complete and universal denunciation of nuclear weapons."

Mr. Thomson also called on lawyers to dust off their legal swords and swing into action to sway public opinion against nuclear weapons.

"The legal community is often in the forefront of social change," Mr. Thomson said in the text of his speech, delivered on the weekend. He referred to international accords — spurred by the legal community — that ban chemical and bacteriological weapons.

"We must direct our message not only to those in charge of governments, but to all citizens of the world who are at risk," said Mr. Thomson, a Toronto lawyer.

"Mankind must be shocked out of its complacent acceptance of the continued buildup and proliferation of nuclear weapons."

Lawyers and the law must help find an exit from nuclear weaponry's cruel and irreversible injury and uncontrollable violence, Mr. Thomson said.

International humanitarian law, inspired by the Geneva conventions of 1929 and 1949 and the 1978 Red Cross fundamental rules, has fashioned a law regulating armed conflict in the modern world. This provides the framework within which to assess the legality of nuclear weapons, Mr. Thomson said.

While bacteriological and chemical warfare have been outlawed by international law, "we now recognize that nuclear weapons are even more inhuman and destructive."

Genocide, which is dealt with in the 1948 Genocide Convention, implies the intentional destruction of cultures and races, Mr. Thomson said, adding pointedly that the foreseeable consequence of nuclear war is the disappearance of entire cultures and races.

CSO: 5120/23

BULGARIA

LATE DELIVERIES SLOW DOWN CONSTRUCTION OF NUCLEAR STATION

Sofia RABOTNICHESKO DELO in Bulgarian 26 Jul 85 pp 1,3

[Article by Veselka Marinova: "The 1,000 Megawatt Reactor is Emerging from the Delay, But What About the Future?"]

[Text] My correspondence related to the regular check on the construction activity at the fifth power block at the Kozloduy Nuclear Power Unit [AEK] begins with the fact that one day is a very long time here, for the changes are visible in such a short time. From the beginning of the year up to now, many things have truly changed at the fifth power block, not only the outward image of the construction itself, but also the organization of labor and the way the builders, fitters, and leaders think. Perhaps this is why everyone is in agreement: much more has been done in the first six months of this year than in the previous two years. In other words, this means that the 1,000 megawatt reactor is now leaving the doldrums behind. A rate for the construction and installation work has been set, and if it is maintained or increased (there are arrangements for this), the deadline for setting it in operation will be kept.

These are the concrete facts which support the conclusion that a decisive step forward has been taken. During the second quarter, the rate of construction and installation work continued to increase. On an average monthly rate, 13.5 million leva were absorbed. In terms of the basic lines, the construction part of the machine hall was finished, laying concrete in the reactor section was concluded, work was begun on installing the top cone of the reactor. A broad work front has been created at all the sites which comprise the block. And two figures alone eloquently illustrate the results. During January of this year, construction and installation work worth 4.5 million leva was completed, while during June the figure was 15 million leva. The labor productivity per worker, which was 1,206 leva in 1982, reached 1,510 leva during June of this year.

There is No Room for Deviation

This is what the workers think, despite the cheerful results obtained during the last few months at this most significant construction site. Here is the slogan displayed at the Directorate for Investor Control: The Nation Awaits the Start-up of the New Atomic Reactor. And for precisely this reason, the

This is what the workers think, despite the cheerful results obtained during the last few months at this most significant construction site. Here is the slogan displayed at the Directorate for Investor Control: The Nation Awaits the Start-up of the New Atomic Reactor. And for precisely this reason, the problems which exist at the giant of our national power supply, which is being built, must be stated with even greater acuteness. The failure to comply with obligations to the Kozloduy site are a hindrance to our economy as well as a failure to respect the selfless labor of the workers here.

The question of supplying the equipment still has not been resolved. There are many organizations which either have not understood the importance of the site or are slaves to the notion of "that's how it is." By the end of June, at the 149 positions that need supplies, only 40 had been fully equipped, 32 partially, and 77 orders had not been supplied in general! Those who are obligated to supply the fifth power block include the State Committee for Planning. The Ministry of Foreign Trade, Tekhnosnab, and the Ministry of Machine Building.

In a conversation, Metodi Terziyski, a section head at the Directorate for Investor Control, emphasized that there are plants which have already made significant contributions to the construction of the fifth block. It is truly heartening that this list is fairly long, and it includes the Vaptsarov and Struma machine building plants in Pleven and Pernik, respectively, the G. Dimitrov pump plant in Vidin, Spartak in Burgas, the Chemical Machine Building Combine in Khaskovo, the Chemical Machine Building Plant in Provadiya.

Unfortunately the same relationships do not hold for the Plant for Heavy Machine Building in Radomir, where, despite the agreements that were signed four years ago, the problems are getting worse, they are not being resolved. This is happening right now, when none of the deadlines can be pushed back any more (something that has often been done in line with the wishes of that plant). Whatever the reasons are for this lack of fulfillment, they cannot hide the fact that the leadership of the combine and the plant is not responding to the problems of the Kozloduy AEK. During this year, we have had similar difficulties with the Khristo Smirnenski crane building plant in Sofia, which has otherwise traditionally been a good supplier to construction sites.

Two of Many

Nine thousand and nine hundred builders and fitters, representatives of various orgnaizations, are working on the fifth reactor. It would naturally be impossible to speak personally with each of them. Thus we chose two out of many organizations, and we spoke with their leaders.

Engineer Stoimen Maksimov, director of Energomontazh at Kozloduy: "We finished installation work on the main circulation pumps at the reactor's base and on the polar crane. We worked in three shifts and in June alone we installed more than 1,000 tons of equipment. We have many problems. The most serious of them involves carrying out installation work on the

low-pressure pipes on account of the incomplete supply of correctly shaped parts and fixtures; this is the fault of the Directorate for Investor Control."

Konstantin Nanovski of the Montazhi State Economic Trust, assistant to the main chief for electrical installation at the block: "Now we are laying 12,000 meters of cable in a day, and by the end of the month we have to get up to 20,000 meters. The Specialized Installation Organization for Automation in Lom is creating problems for us because it is not supplying the necessary electrical panels. And the okrug sales and supply organization in Vratsa must do a better job in organizing the supply of a number of cables because we are already experiencing a shortage. And one more matter: sending workers here for 45 days each does not solve problems, it makes construction matters more difficult. What is the attitude toward the nuclear plant plant: "So, they need workers, we'll send the least qualified workers there. And precisely this type of worker is not needed at all."

Another basic, major problem involves cadres. So far not one of the ministry branches has complied with its obligations to the fifth block. Of the 1,200 workers announced, only 365 have been sent. The same holds true for the okrug people's councils. Of the 20 okrugs which must send workers, only three have complied: the Veliko Turnovo, Vratsa, and Plovdiv okrugs. But in addition to the numbers of workers and their training, another problem is the supply of tools for normal working conditions. These are in limited supply. Some of the brigades have three or four workers on one electric welding machine. The Tekhnosnab Foreign Trade Organization and the Ministry of Machine Building have something to think about in regard to this matter.

We Have to Start Thinking About Tomorrow Today

The problems of the sixth power block, which must be set in operation by June of 1988, are already upon us, and construction is just beginning. Although the two blocks are identical, the main problem is now shaping up as the coordination of designs for the reactor section. This task has clearly been ignored by the Energoproekt Institute, Another matter: how can this same institute give any justification for delivering blueprints designed for the fifth power block? Why are difficulties cropping up now, at the beginning of construction at the sixth power block?

There is hardly a plant or organization in Bulgaria whose traces are not visible at the Koz'oduy AEK, for here, at the vast construction site, their failure or positive results are most in evidence. The fifth reactor is not only a way of checking their capabilities, it is also a precise measure of their leaders' and workers' way of thinking.

12334
CSO: 5100/3037

YUGOSLAVIA

## NUCLEAR POWER PLANS FOR VOJVODINA TO 1990

Novi Sad DNEVNIK in Serbo-Coratian 24 Aug 85 p 5

[Excerpt] Although discussions about the use of nuclear energy for producing electric power in Yugoslavia are intensifying and the opponents of atomic powerplants are being heard more, according to initial projections of the medium-term plan for developing the electric power economy of Vojvodina up to 1990 and according to the needs of the economy and of the population, this modern source of energy will be built in the province.

If there are no essential changes, on 1 September the international competition of the Society of the Yugoslav Electric Power Economy will be announced to collect bids to build a series of nuclear powerplants in Yugoslavia, the Prevlaka nuclear powerplant especially, and the nuclear fuel cycle.

Construction of the first such plant in Vojvodina should be completed in 1997. This requires great preparation, the engagement of numerous scientific and specialized institutions, the adaptation of industry to be prepared for the first orders of equipment, and considerable material resources.

The future series of plants will be one of the strong links connecting the Yugoslav community. Thus the "Belgrade" Zdruzena elektropriveda [Associated Electric Power Industry] and the Elektrostopanstvo [Electric Power Economy] of Macedonia are interested also in the first plant to be built in Vojvodina. It is known that one-half of the power of the plant will be used by consumers in Vojvodina, while the other half will be used by the electric power industry in areas interested in joint development. The power from this plant, together with other sources to be completed between 1986 and 1995, would be enough to satisfy needs to the end of the century.

In the course of building the first nuclear powerplant preparations must also begin for building another unit in the same location.

The "Nuclear Power Plant Construction" Work Organization within the "Elektrovojvodina" enterprise has concluded an agreement with the Belgrade "Energoprojekt" enterprise on preparations for determining the location of the first such plant in Vojvodina. The choice has been narrowed down to a site downstream from Bogojevo on the Danube, a location near Mladenovo at the mouth of the Mostonga River, and near Celarevo.

Of these three locations we must select one, says Milos Vlaisavljevic, director of the "Nuclear Power Plant Construction" Work Organization. All the seismic and geological facts relating to safety must be tested and studied in detail. The interrelation of the nuclear installations and the environment must be known in detail... Vlaisavljevic said that the most qualified specialists from throughout the world will be engaged in this... They will work together with experts from the International Atomic Agency.

CSO: 2800/3039

## COMMISSION ESTABLISHED TO EVALUATE NUCLEAR POLICY

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Sep 85 p 22

[Text] Brasilia--The Commission to Evaluate the Brazilian Nuclear Program will consist of 17 persons, who will serve without remuneration. Their participation will be considered as "relevant service." The measure was published today in the federal DIARIO OFICIAL and the commission will have 180 days to submit a report offering suggestions for the new Brazilian nuclear policy.

The chairman of the commission will be the adviser on nuclear affairs for the Ministry of Mines and Energy, Professor Jose Israel Vargas. The group will act along three lines to submit suggestions for formulating the new nuclear policy: an analysis of the demand for energy over the next 20 to 30 years and, from that basis, a discussion of the part to be played by nuclear energy; the current stage of technological development in the field, including the current state of research and industrial development of the sector; lastly, an assessment of the environmental dimension, examining the impact of various types of energy (hydroelectric power, nuclear power and power obtained from derivatives of petroleum and coal) on the environment.

Prof Jose Israel Vargas said a discussion of the place of nuclear energy in the framework of the nation's general demand for energy in the coming years is essential. He cited, for example, the ELETROBRAS [Brazilian Electric Power Companies, Inc.] study that predicts demand to increase at a 7 percent annual rate over the next few years. It also sees hydroelectric power retaining its primacy during the longer term of 20 to 30 years.

Even so, he stressed the importance of a policy for generating nuclear energy for this sector because of the immense fertile areas that would have to be inundated in order to form hydroelectric reservoirs. He agreed that this is a serious social problem that must be avoided.

Members of the commission will include businessmen, engineers, scientists and specialists in the environmental field, especially protection against radiation, such as Jose Mindlim, vice president of FIESP [Sao Paulo State Federation of Industries]; Gaspar Erich Stemmer, professor and head of the Mechanical Engineering Department at Santa Catarina Federal University; and Alberto Pereira de Castor. There will also be representatives of the Foreign Affairs and Science and Technology ministries, the general secretariat of the National Security Council, the Brazilian Institute of Nuclear Quality and the Association of Nuclebras Employees.

8834
CSO: 5100/2175

BRAZIL

## TOURIST RESORT PLANS NUCLEAR WASTE SITE PROTEST

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Aug 85 p 16

[Excerpt] The city of Itu, a tourist resort 100 kilometers from Sao Paulo, will come to a halt this afternoon. A massive demonstration to protest against the continued presence of recyclable nuclear waste dumped by NUCLEMON [Nuclebras Monazite and Associated Elements, Ltd.], a Nuclebras subsidiary, within the municipality's limits was organized by the municipal government for 1400 hours, bringing together labor unions, professional groups, neighborhood groups and students in the municipal stadium. From there, the demonstrators will march 15 kilometers to the facilities of NUCLEMON. Surprised by this mobilization, the NUCLEMON management announced that the dump has been closed since October 1981 and carries no risk of contamination.

The NUCLEMON dump, begun in Itu in 1977, is for residue from the chemical processing of monazite, a mineral known also as "torta II" [literally, second cake] and economically recyclable in making the salts of thorium and uranium. At first this material was dumped in open ditches, which led the municipal government to request a measurement of the radiation levels in the air and in the tributaries of the Monjolinho and Taquaral rivers that supply the city, to be made by the Physics Institute of Sao Paulo University.

At the time, according to a report signed by Jose Goldemberg, then the director of the Physics Institute, it was proven that the level of radioactivity inside the dump was above the permissible maximum, and the concentration of radioactive gases was 10 times the permissible limit. Also according to the report, the presence of these gases in the amounts detected presented risks to the populace, and it was suggested that NUCLEMON cover the dumps to prevent leakage of radioactive gases.

The Stella Azzurra firm, which processes sisal in the Aratu Industrial Center, was fined for the second time in 15 days by the Bahia Environmental Resources Center, in the amount of 800 ORTN [Indexed National Treasury Bonds], the equivalent of 39.5 million cruzeiros, for not having yet formally submitted the plan for transporting 31.8 tons of sodium pentachlorophenate (China powder) it has kept in shipping containers in the port of Salvador.

8834
CSO: 5100/2175

SPACE ARMS

BRAZIL

## PROCEEDINGS OF PUGWASH MOVEMENT MEETING IN SAO PAULO

### Chinese Delegate on Nuclear Capability

Sao Paulo FOLHA DE SAO PAULO in Portuguese 3 Jul 85 p 24

[Text] Campinas--At 2000 hours today in Campinas (located 98 kilometers from Sao Paulo), Science and Technology Minister Renato Archer will preside over the formal opening ceremony of the 35th Annual Meeting of the Pugwash Movement. The meeting, which will be held at the Cultural Center and the Carlos Gomes Institute of that city and last until the 8th, will bring together 110 scientists from all over the world for discussions on and suggestions for world peace and disarmament.

Among the participants at the meeting are: the winner of the 1964 Nobel Prize for chemistry, Dorothy Hodgkin; the vice-chairman of the People's Political Consultative Conference, Zhou Peiyuan; scientist I. Shokilov of the Soviet Academy of Sciences; public health specialist of the University of Pennsylvania, Martin Kaplan; and nuclear energy researcher of the University of California, John Holdren.

The scientists will meet in restricted session for 5 days and at the end of the meeting they will collate the proposals approved in a document to be forwarded to all the chiefs of state in the world as well as international organizations.

Speaking to the press yesterday in the name of the Chinese delegation, the vice-chairman of the People's Political Consultative Conference and doctor of physics, Zhou Peiyuan, supported the position that the countries of the so-called Third World, such as Brazil and Argentina, should develop nuclear energy technology "if they feel the need to have it for peaceful purposes."

In his opinion, that is a way of "breaking the monopoly of the two superpowers: the Soviet Union and the United States." Zhou Peiyuan, 70 years old, justified China's first atomic explosion, which occurred in 1964, "along that line of thinking, namely, as a way of breaking the nuclear monopoly.

However, Peiyuan considers the outbreak of a nuclear conflict unlikely, with the argument that the country that plunges the world into a nuclear holocaust

will inevitably be involved in it because we all know that after the explosion would come the nuclear winter and the nation that started it would suffer the consequences."

With regard to the discussion about nuclear disarmament, Zhou Peiyuan considers that the nations should deal with that topic only after the two superpowers begin the curtailment of tests and the withdrawal and destruction of weapons "because they are responsible for 95 percent of those weapons."

## Soviets on 'Star Wars' Danger

Sao Paulo FOLHA DE SAO PAULO in Portuguese 4 Jul 85 p 29

[Text] Campinas--The 35th Annual Meeting of the Pugwash Movement opened yesterday in the Cultural Center of Caupinas with the participation of more than 100 scientists from various countries. The meeting will last until next Monday and the center of its discussions are the problems of peace and disarmament on a world scale. The discussions will be held in restricted session and the proposals to be approved are to be forwarded to all the chiefs of state in the world.

The movement, which embraces scientists of different nationalities, was born immediately after the explosion of the second atomic bomb in Japan in 1945, being officially launched in London in 1955 by a group of scientists on the basis of a document prepared by them in the small city of Pugwash, Canada.

Among the scientists present are: Dorothy Hodgkin, winner of the Nobel Prize for molecular chemistry in 1964 and president of the movement; Joseph Rotblat, a scientist specializing in atomic energy, from the University of London; Klaus Gottstein, director of the Max Planck Institute; Maciejz Nalecz, of the Polish Academy of Sciences; the several Soviet scientists.

The participants will be divided into five working groups with specific topics. In addition to that, a general topic on North-South and East-West relations will be discussed by all of them.

Yesterday, the Soviet scientists who are participating in the 35th Annual Meeting of the Pugwash Movement sought to stress the dangers represented by the "Star Wars" project in the event that the U.S. Government decides to proceed with it. According to the specialist in military problems and member of the academy of Sciences of Russia, Ladislav Micharin, 53, "the project would demobilize the whole process of negotiations on nuclear and strategic disarmament underway."

In the opinion of Anatoliy N. Glinkin, 56, a specialist in Brazilian history and chief of the Department of Latin American History of the Russian Academy of Sciences, "the efforts of the Soviet Government and scientists are directed at not permitting the militarization of space."

## Brazilian-Argentine Pact Urged

Sao Paulo FOLHA DE SAO PAULO in Portuguese 6 Jul 85 p 21

[Text] Campinas--Yesterday, on the second day of the proceedings of the 35th Annual Meeting of the Pugwash Movement in Campinas, physicist Luis Pinguelli Rosa, 43, professor of the Federal University of Rio de Janeiro, advocated the urgent need for the signing of a bilateral Brazilian-Argentine agreement, with technological cooperation in the nuclear field and a commitment by those two countries not to build an atomic bomb.

Pinguelli Rosa expressed the fear of the nuclearization of all of Latin America in the event that Brazil and Argentina continue to follow the courses pursued until now to build the atomic bomb within an average period of 5 years. In the opinion of the physicist, despite the historic rivalry that surrounds them, those countries must realize that there is still time to decide not to build the atomic bomb because of the simple fact that "having the bomb automatically means being the target of another nuclear bomb.

### Responsibility and Politics

Concerned about the prospect of construction of a Brazilian bomb, physicist Pinguelli Rosa said that the Brazilian political parties have not assumed the political responsibility of expressing themselves clearly on the nuclear issue. "In Brazil, the political parties are shortsighted, incapable of discussing the issues that emerge from the political structure of power."

With regard to the Brazilian Government, Pinguelli Rosa said that for reasons of principle, it should always express itself against the atomic bomb, and he found odd President Jose Sarney's recent statements to the world press, when he said that Brazil is not developing technology aimed at the atomic bomb.

According to the physicist, this statement by President Sarney is "mistaken," inasmuch as the minister of the navy himself, Henrique Saboya, has already stated that a nuclear submarine is in the process of development in Brazil the technology of which is much more sophisticated than the atomic bomb itself.

"Everybody knows that Brazil has a parallel nuclear program underway by the navy and aeronautics," observed Pinguelli Rosa, who believes that this fact cannot be omitted when one speaks about technology for the construction of the atomic bomb. On the other hand, the physicist praised the position of the president of the republic for telling the foreign reporters during the same interview that the Brazilian-German nuclear agreement is not a priority of the government of the "New Republic."

The meeting of the Pugwash Movement, which includes scientist supporters of peace and world disarmament from various countries, will continue until Monday and should approve proposals in that regard to be forwarded to all chiefs of state in the world.

## Soviet Decries Space Militarization

Sao Paulo FOLHA DE SAO PAULO in Portuguese 8 Jul 85 p 14

[Text] Campinas--The 35th Annual Meeting of the Pugwash Movement, which has been in session since last Wednesday and brought together more than 100 scientists from 60 countries to discuss proposals designed to aid disarmament and world peace, will close in Campinas today. At the end of the proceedings, a document will be prepared containing the resolutions of the meeting, which is to be forwarded to all the chiefs of state in the world.

On Saturday, Soviet lawyer Valdislav Misharin, a specialist in international law directed at nuclear disarmament blamed the United States for the dangers of a nuclear war in not accepting the Soviet Union's proposal to freeze nuclear weapons.

According to the specialist, the space arms race could break the current framework of strategic control and stability between the two superpowers because it is impossible to foresee the consequences in space, which hampers any negotiations between the two countries. In the opinion of the Russian specialist, in addition to being very expensive, nuclear weapons are veritable "white elephants."

### Disastrous Results

The Israeli physicist, Shalheveth Freier of the Weizmann Institute and former director of the Israeli Atomic Energy Commission, declared that the nuclear confrontation between the two superpowers entails disastrous results for the rest of the world due to the involvement of those countries with the other nations, including in case of war. Freier does not believe the Americans or Russians want nuclear war but observed that the two superpowers "are prisoners of their double fears." According to the physicist, "in order to resolve this conflict, successive meetings are necessary between the two countries, having as their goal the good of humanity."

## World Peace Manifesto Issued

Sao Paulo FOLHA DE SAO PAULO in Portuguese 10 Jul 85 p 19

[Text] Campinas--In a six-page document entitled, "East-West Conflicts and the Third World; Interrelations and Implications for Peace," issued at the conclusion of its 35th annual meeting held in Campinas last week with the participation of 130 scientists from 60 countries, the Pugwash Movement expressed its concern over the fact that the United States and the Soviet Union are unable to stop the arms race, contributing to other countries also becoming nuclear powers. The Pugwash Movement, begun 35 years ago in the city of Pugwash, Canada, has about 1,000 active members, the majority of them scientists, who fight for peace and nuclear disarmament. The next meeting will be held in 1985 in Budapest, the capital of Hungary.

This year's Pugwash Movement document gives greater emphasis to the problems of the Southern Hemisphere. It calls Brazil and Argentina to task for not having signed the treaty on the nonproliferation of nuclear weapons and for

not adhering fully to all the provisions of the Tlatelolco Treaty. The members of the Pugwash Movement sent copies of the document to the leaders of all countries, including President Jose Sarney. The document also calls for preventing the militarization of space and broadening the measures to restrict and control chemical warfare, in addition to supporting the Contadora Group and attacking apartheid in South Africa.

The movement sent a telegram to U.S. President Ronald Reagan and the leader of the Soviet Union, Mikhail Gorbachev, in which it congratulates the leaders of the two countries for having scheduled another meeting in Geneva in November of this year to discuss nuclear disarmament. In the telegram, the members of the Pugwash Movement ask the leaders of the two superpowers to take into consideration not only the specific problems of the United States and the USSR but also the problems that affect the other regions of the world.

8711
CSO: 5200/7

PERU

## BRIEFS

IPEN PRESIDENT AWAITS FUNDING--Peruvian Army Gen Juan Barreda Delgado, president of the Peruvian Institute of Nuclear Energy [IPEN], reported yesterday that the last phase of the Huarangal nuclear program, which is 90 percent completed, will cost $18 million. He said that he is awaiting authorization by the Bicameral Commission to obtain $6.5 million. Argentina will contribute an equal amount to the program and the remainder will be provided by its Peruvian counterpart. The Huaranpal program should be completed in 1987. After stressing the importance of nuclear energy in agricultural and medical programs, fields in which it can have a vital role, he said that Peru is rich in uranium and that the deposits found in Puno and in Toromocho insure the self-sufficiency of the Huarangal plant. Barrera, who will go this weekend to Brazil to attend an international meeting on nuclear energy, made these statements at the Jorge Chavez international airport where he had gone on personal business. [Text] [Lima EL COMERCIO in Spanish 2 Aug 85 p A-8] 9204

CSO: 5100/2165

INDIA

URANIUM SMUGGLERS ARRESTED BY CUSTOMS OFFICIALS

Calcutta THE TELEGRAPH in English 21 Aug 85 p 5

[Article by Yubaraj Ghimire]

[Text]

Patna, Aug. 20 Customs officials of Forbesganj, assisted by the police, have arrested five persons on charges of smuggling uranium to unknown destinations via Nepal recently. The racket was unearthed when about 5 kg of uranium was recovered from one Rajendra Choudhary in Barauni.

According to information available here, the smugglers used to get uranium from Jadugoda mines in Singhbhum and then smuggle it to Biratnagar in Nepal. It was from this point in Nepal that the uranium used to be smuggled to other countries.

A businessman now based in Biratnagar and an employee of the Royal Nepal Airlines posted there have been identified by the accused as parties to the racket.

The Bihar government is reportedly considering handing over the investigation to the CID and a special team has already been sent to Forbesganj to ascertain whether the smuggled material was uranium or not. Senior officials said they were not familiar with uranium and before initiating any action, they wanted to be sure about the radioactivity of the seized material.

Of the five persons arrested, Kartik Biraji and Khagendra Singh belong to Purnea district, Sunil Kumar is from Samastipur and Rajendra Choudhary and one other from Barauni. All of them have been lodged in Araria jail in Purnea district, and a case registered in the Forbesganj police station.

The racket was busted by an assistant collector of Customs at Forbesganj, Mr B.K. Singh, under whom a special team was investigating the matter for over a year. The arrests were made after a tip-off last week from a local uranium dealer. A police team led by a sub-inspector nabbed the smugglers in a Purnea hotel where they had gone to dispose of uranium worth over Rs 2.81 lakhs. Two more persons were later arrested with more uranium on the basis of their statement.

CSO: 5150/0065

# INDIA SAID TO 'COME OF AGE' IN NUCLEAR SCIENCE

Calcutta THE TELEGRAPH in English 14 Aug 85 p 6

[Editorial]

"Freedom," wrote Jawaharlal Nehru more than a decade before it came, "is not the end. It is the means of achieving another end." On August 15, 1947, we got our political freedom, but true independence was still a dream and a promise and a pledge. "The achievement we celebrate today is but a step, an opening of opportunity, to the greater triumphs and achievements that await us," said the first Prime Minister in his first speech to a free nation. "The past is over and it is the future that beckons to us now," he added. Thirty-eight years have passed since that midnight, and it is time now to examine whether we have squandered that future or been "brave enough and wise enough to grasp this opportunity."

No, in these 38 years we have not rid ourselves of the most vicious legacy we inherited from the British, poverty: despite having won the battle for food production we have not been able to nourish every hungry stomach or wipe away every tear. No, in these 38 years we have not been able to rid ourselves of the next worst legacy, the marriage of religion to mass politics. No, in these 38 years we have not been able to improve upon a boon left behind by the British: a modern attitude towards and structure for education; instead there has been stagnation in thought and decay in the institutions. But in these 38 years, we have achieved one crucial victory. We have moved much nearer towards that extremely critical national goal—the goal of independence.

If the battle of freedom was finally won in the Forties, the first battle of independence ended in victory after more than two long decades of effort, in the late Sixties and early Seventies when the Indian farmer was finally given the technology and water to make his hard work bear proportionate fruit. It was this achievement, more than anything else, which gave a true measure of independence to Indian foreign policy. When you do not have to stretch one hand for food—even assuming you have money to pay for it in the other—you become far less vulnerable to international pressures. But the other thrust begun by Nehru and his friends like Homi Bhabha, the search for scientific progress, took a little while longer. On the eve of its thirty-eighth birthday, India can proudly claim that it has come of age in nuclear science. That moment came at 2.42 am on August 8 at the Bhabha Atomic Research Centre at Trombay when our country's sixth and largest nuclear reactor became critical.

At that moment, the "fuel-for-Tarapur" syndrome which has vexed Delhi for so long, died. Dhruva is totally indigenous and therefore outside the "safeguard regulations" of the International Atomic Energy Agency. It will produce the plutonium for the second generation fast breed test reactors. And it is the largest such reactor in the world. This is an achievement which, without any exaggeration, puts India on a par with the rest of the world in nuclear potential. And now that the potential is there, it is up to us to decide in which direction we want to channelise our talent and effort. We are no longer prisoners of agreements designed to serve the interests of superpowers who, having taken an edge over the rest of the world, are determined to maintain the gap in their favour. In the Sixties it was fashionable when comparing the two Asian giants to deride India and praise China's acquisition of both bread and the bomb. Today, the president of the World Bank, Tom Clausen, praises India for solving its food problem and the world must, whether it has the decency to admit it or not, accept that India has the capability to produce the bomb but refuses (unlike Maoist China with its pretensions) to do so as a matter of policy. Considering that there were very few people in 1947 who were willing to grant that this new nation would even survive, this is not bad by way of achievement in 38 years. The dream of Jawaharlal Nehru might have only come true in the life of his grandson, but Dhruva would have never been built but for that dream. Let us, during our national birthday celebrations, leave aside a moment for those men of vision and strength who laid foundations of love and steel. The "dancing star of freedom," to use Nehru's phrase, could have sunk into chaos, as he himself warned. If we have preserved some, and built some, it is in great measure because of yesterday's sacrifices.

CSO: 5150/0064

INDIA

## NUCLEAR ANALYSTS RESPOND TO PAKISTANI'S LETTER

Calcutta THE TELEGRAPH in English 28 Aug 85 p 4

[Text] New Delhi, Aug. 27 (PTI): Nuclear analysts here have questioned Dr A.Q. Khan's reiteration that Islamabad's offers to Delhi to renounce the weapon option are sincere. Dr Khan is the scientist behind Pakistan's uranium bomb project.

Responding to a letter from Dr Khan published in *The Muslim*, a Pakistan daily, the analysts said the motive behind Pakistan's proposals was to make India accede to the nuclear non-proliferation treaty. This would give legitimacy to the arsenals of the five nuclear weapon powers and accept Chinese nuclear hegemony in the Indian subcontinent.

Reiterating the peaceful nature of India's nuclear programme, they questioned the credentials of the Pakistani policy and said a survey of the various developments regarding Islamabad's nuclear programme shows that it is progressing towards the bomb, if one has not been made already.

In his letter, Dr Khan reiterated the various Pakistani proposals to India to renounce the weapon option, and said Pakistan was "sincere and straight forward" in its proposals. He also questioned the peaceful credentials of India's programme and, referring to the 1974 Pokharan peaceful implosion, said, "We do not differentiate between a device and a bomb."

The letter was in response to an article in the daily by the noted Indian defence analyst, Mr K. Subrahmanyam, entitled "Why Pakistan wants the bomb?" Mr Subrahmanyam had said in the article that he found the Pakistani case for a bomb "rational and sensible," but opined that Islamabad was "insincere" in its offer to renounce the weapon along with India.

Referring to the Pakistan't proposals to India to renounce the weapon option, the analysts noted that Pakistan's stand vis a vis the non-proliferation treaty was not based on any principle but by the fact that India has not signed it.

India, they said, has not signed the treaty because it was unequal; did not control proliferation among the weapon powers and legitimised nuclear weapons as the currency of power.

Referring to the offer regarding mutual inspection of the nuclear facilities, they felt it was asymmetrical to India and only adequate mutual confidence could make such inspection a success. They noted that references in the letter by Dr Khan to Mr Subrahmanyam as "the notorious Indian Josef Goebbels" and his being "fully aware of the hatred" that "such extremist Hindus" had against "the Muslims in general and Pakistan in particular" did not help to build mutual confidence.

Recounting the various steps indicating Pakistan's move towards a bomb, the nuclear analysts said Dr Khan had worked with a urenco nuclear enrichment facility in the Netherlands. Moreover, Pakistan had imported natural uranium from the Niger through Libya, procured 6,200 centrifuge tubes from the Netherlands for the enrichment facility at Kahuta and claimed that it had acquired the capability for enrichment beyond the power-grade three per cent.

Pakistan also successfully tried out the US-made krytron electronic switches in a non-nuclear explosion recently.

CSO: 5150/0067

PLANS, FUNDING FOR NUCLEAR ENERGY PLANTS DISCUSSED

Bombay THE TIMES OF INDIA in English 13 Aug 85 p 8

[Article by K. C. Khanna]

[Text]

IT is unthinkable that the Planning Commission's sharp cuts in the overall allocation for the power sector in the seventh Plan should have left the department of atomic energy unscathed. The DAE, however, has been hoping that the new government's love affair with high-tech and the superior economics of nuclear power plants (NUKES) *vis-a-vis* coal-fired stations will, in the end, prevail and that it will get more or less what it wants. This may still happen but that remains to be seen.

The DAE had projected a requirement of nearly Rs. 4,300 crores for the 1985-90 period, the bulk of it for power generation and related facilities, within the framework of its 15-year plan to raise the installed capacity effectively from 1330 MW at present to about 10,000 MW by the end of the century. It envisaged the construction of 12 new 235-MW reactors of a standard design and ten more 500-MW ones in addition to the eight that have been either already commissioned or are under construction at Tarapur, Kota, Kalpakkam, Narora and Kakrapar. But now the fate of this brave blueprint hangs in the balance.

## Resource Constraint

The government, it appears, is torn between its desire to push the country's nuclear power programme at a breakneck pace and Yojana Bhavan's inability to find the requisite funds. It has accepted in principle the DAE's argument that standardised NUKES should be built in series and located in clusters to shorten the gestation period, cut unit costs and get the best value for the money spent on the infrastructure. But it is wondering whether any great harm will be caused if the DAE's 15-year plan is implemented, say, over 20 years.

The DAE's answer, of course, is an emphatic "yes". It contends that many state-owned and private firms have just assembled the expensive facilities and the skills required to deliver sophisticated nuclear equipment at a reasonable cost and in good time. It would be suicidal to break their momentum by stretching out the orders. As it is, the DAE has considerably lowered its sights in view of the resource constraint. Originally it wanted to start work on all of the 12 new 235-MW and six of the ten new 500-MW reactors during the seventh Plan. In January it got the green signal to go ahead with four smaller ones—two at Kaiga in Karnataka and two more at Kota in Rajasthan. Of the remaining 14, it decided to restrict the fresh starts to only six: two of 235 MWs and four of 500-MW size.

But the planners have flattered the DAE by, in a way, upstaging it. They have suggested that it should drop its plans to put up two more smaller reactors and, instead, begin work on six, not four, 500-MW reactors in the current Plan. Their reasons are both technical and economic. Yojana Bhavan is convinced that the department has made rapid strides in designing the larger power stations. Their gestation period—about eight years—would be the same as for each of the smaller ones and yet they can feed more than twice as much power to the power grids. The skilled manpower required to build or operate them will be no greater. And the units costs of the electricity they generate will be 15 to 20 per cent lower. The DAE, however, would still prefer to keep its line of 235 MWs going till the middle of the next Plan and restrict fresh starts with the unproven technology of its upscaled plants to four during 1985-90.

While these inter-ministerial differences are being sorted out, the related question of funding is receiving equal attention. The government has steeply increased the allocation for the DAE's plan expenditure to about Rs. 500 crores in this year's budget. It has, moreover, firmly earmarked a total sum of about Rs. 3,400 crores for the department in the seventh Plan, including about Rs. 1,700 crores for its power component and Rs. 1,400 crores for its heavy water plants, fuel fabrication and related facilities. It has also indicated that more money might be allotted to the DAE at the time of the mid-term review of the current Plan. In any case, the department will be entitled to a slice of the funds to be disbursed by proposed power development finance corporation. Finally, the DAE's Nuclear Power Board may be permitted, like other state-owned undertakings, to raise some money from the market.

## Quantum Jump

This would be entirely appropriate because the Nuclear Power Board's commercial operations are expanding and it has successfully seeded the birth of a high-growth industry. Apart from commissioning the second unit of Madras atomic power plant, it will complete and link two units at Narora and two at Kakrapar to the national grids by 1991. Thus the installed capacity of NUKES will go up from 1330 MW at present to 2270 MW in short order. It sells electricity to the state electricity boards at about 32 paise a unit from Tarapur, 36 paise a unit from Kota and 42 paise a unit from Kalpakkam and yet it makes a tidy profit. Its gross revenue this year is likely to go up from Rs. 125 crores last year to nearly Rs. 200 crores.

That apart, the capabilities for the manufacture of nuclear equipment have taken a quantum jump in both public and private sectors since the early seventies when few firms were willing to take up the challenge. Walchand Industries, for instance, took seven years to deliver the calandria for Narora but will complete one for Kakrapar in two and a half years. Larsen and Toubro have similarly shortened the delivery time for end shields from seven years to three and a half years. BHEL can now fabricate turbo-generator sets for Kakrapar in four years instead of six years. Such examples can be multiplied.

Equally to the point, many Indian companies are gearing up to take advantage of batch orders that the DAE's Rs. 13,900 crore long-term plan (at 1983 prices) will generate over the next decade in collaboration with foreign firms, particularly in the area of conventional components. Thus a Swedish firm is negotiating with the Electronics Corporation for the manufacture of instrumentation and control equipment, KSB (India) has tied up with its West German principals for the manufacture of a range of specialised pumps and a French firm has done so with Bharat Pumps and Compressors. While encouraging such joint ventures, the Nuclear Power Board, however, carefully monitors the reliability of foreign collaborators. It wants to avoid a situation where it might become vulnerable to what one of its senior officials has described as "American pressure by the back door".

## Coming Of Age

As things are, the U.S. government is doing all it can through the cartel of major nuclear equipment suppliers, the so-called London Club, to thwart the DAE's progress. "They routinely bend their own rules", the official said, "in favour of Pakistan and against us". In the recent past, American companies have been stopped from selling to India even such innocuous components as primary coolent pumps, valves and radiation shielding windows. Washington has also imposed curbs on the supply of equipment for fertiliser plants if the latter can conceivably be used to produce feed gas for the production of heavy water. The sale of American computers for the Indian nuclear industry has been banned for several years, but now the "trigger list" of the London Club too has been vastly expanded to cover these and a whole range of other products as well as basic materials.

All this may make life a little more difficult for the DAE's scientists but it will not pose any insuperable problems. The nuclear industry in the country has come of age. Indeed, one of its problems is to meet galloping demand. Practically every state wants a nuclear power station. Taking the economic, technical and strategic factors into account, a committee headed by the chief of the Nuclear Power Board, Dr. M. R. Srinivasan, has drawn up a list of 12 potential sites (for the government to choose from) in the northern, southern and western regions. Ideally it wants to set up a cluster of eight nuclear reactors at each selected site but that is not to be.

Political pressures have forced the Centre to ask the committee to look for suitable sites in the eastern region as well, even though most of the coalfields and much of the country's hydel potential is located in that area. That apart, Tarapur and Kotah are clearly within the range of Pakistan's F-16s and Narora just about. Yet, Punjab and Haryana are competing fiercely, among a host of other states, with Bihar, West Bengal and Orissa for nuclear power plants.

INDIA

## DHRUVA'S CRITICALITY STAGES REPORTED

Calcutta SUNDAY in English 1-7 Sep 85 p 62-63

[Text] 6 August 1985. As the world mourned the 40th anniversary of Hiroshima, the countdown for commissioning India's largest research reactor began in Bombay. Scientists of the Bhabha Atomic Research Centre (BARC) turned on the pump that began filling heavy water inside the cavernous core of the Dhruva reactor that was being loaded with fuel: natural uranium. Then came the shock. A valve that should have closed automatically failed and the precious heavy water began to overflow. By the time scientists detected the failure, four tonnes of heavy water valued at Rs 15 million had been lost. "The spillage was not an accident but a pre-criticality hazard," said an embarrassed BARC spokesman. The incident was quickly forgotten as two days later scientists rejoiced when Dhruva became critical, 12 years after the project began and Rs 2,000 million having been spent.

Much of the spilled heavy water could be salvaged and purified but the incident was a warning to BARC which had been overanxious to commission Dhruva before fully testing the interlock systems and safety devices. If the valve had failed during normal operation the consequences would have been worse. Sources say that BARC should have been extra cautious, particularly after a previous accident when one of Dhruva's coolant pumps imported from West Germany was totally damaged while it was being tested with ordinary water. The pipings which were supplied by the BARC workshop were not cleaned, and so the steel fillings inside the pipe were sucked into the pump, damaging its parts. In fact, a tussle is going on between the Department of Atomic Energy (DAE) and the independent Nuclear Regulatory Board (NRB) responsible for safety of nuclear reactors. While the NRB has been insisting that it should approve Dhruva before commissioning, DAE maintains that the board's responsibility covers only power plants and not research reactors. To be fair, NRB has neither the expertise nor the manpower to carry out its functions, an argument used by DAE to justify the commissioning of Dhruva without waiting for the board's approval. Besides the coolant interlock that failed, there are three or four more similar systems in Dhruva that would have to be thoroughly tested before the reactor's power level could be safely raised to the maximum of 100 mw.

That deadline is likely to be many months away as Dhruva is plagued by a more serious problem: vibration of the fuel rods. BARC engineers say that the rods vibrate as coolant heavy water flows under pressure through the aluminium flow tube The vibrations can rupture the fuel rods and contaminate the coolant. "The reactor will never be able to reach higher power until this problem is solved," said one BARC expert. The fuel bundles were made in the Fuel Fabrication Plant in Trombay while all the power reactor fuel elements are made at the Nuclear Fuel Complex in Hyderabad.

Once Dhruva overcomes these problems and begins normal operations, hopefully, next year, BARC scientists will have a new and better facility for research. Being a research reactor, Dhruva will not produce electricity. The heat produced

is extracted by coolant heavy water, passed on to ordinary water in a heat exchanger, and then the hot water is thrown into the sea. The only thing Dhruva will produce is a stream of particles called neutrons which is a basic tool for nuclear research, particularly in the study of solid state. At its peak operation of 100 mw, Dhruva will generate at the centre of its core 180 trillion (million times million) neutrons per square centimetre per second. Beam tubes surrounding the core will transport these neutrons through the reactor vault into the experimental area. Isotopes for medicine and agriculture can also be produced by loading the elements inside a tube and irradiating it inside the core.

Dhruva will be the largest among India's research reactors (India has five more) and about 2.5 times bigger than Cirus, the 25-year-old Canada-built reactor which will have to be decommissioned in five-to-seven years. But the emergence of Dhruva in India's nuclear sky comes at a time when research reactors are becoming out of fashion the world over. Most of the experiments that can be done with neutrons have already been done. The five or six reactors of the type of Dhruva operating elsewhere are primarily used for training. Accelerators are replacing reactors as source of isotopes and for nuclear research.

Dhruva will, however, be an additional source of plutonium, a material used in nuclear bomb. According to DAE, it will annually breed as a byproduct about 30 kilograms of plutonium which will be outside international safeguards. However, officials have denied reports that Dhruva was meant expressly for the production of plutonium for bombs to counter Pakistan's nuclear threat. All nuclear reactors in the world using uranium as fuel do produce plutonium and Dhruva is no exception. It may be incorrect to link Dhruva with nuclear weapons programme as this purpose can be better served by building dedicated facilities exclusively making plutonium for bombs. In fact, all the nuclear powers began their bomb projects by setting up what are known as production reactors to make plutonium and later switched to dual purpose reactors that made plutonium and some quantity of electricity as a bonus.

In fact, India is not dependent on Dhruva for plutonium in case it decides to go nuclear. It had been reprocessing spent fuel of Cirus since 1964, accumulating some 400 kilograms of plutonium over the years. The plutonium for the Pokhran blast in 1974 came out of this and another 100 to 120 kilograms were used to make fuel rods for the fast breeder test reactor nearing completion at Kalpakkam near Madras.

CSO: 5100/4787

INDIA

## U.S. ASSURED COMPUTERS NOT FOR NUCLEAR USE

Madras THE HINDU in English 31 Aug 85 p 1

[Text] After protracted exchanges spread over several months, India and the U.S. have finally evolved mutually acceptable assurances that sophisticated computers would not be used for any nuclear purposes that are not consistent with American laws on the subject.

A letter to this effect from the Government of India to the U.S. embassy in New Delhi for transmission to Washington, handed over on August 23, has cleared the way for the grant of import licences by the U.S. Department of Commerce for the sale of the super computers that India wants to buy for various uses.

**Built-in guarantees:** After the Memorandum of Understanding (MOU) on transfer of high technology was signed in November last, a follow-up agreement on procedures for the sale of equipment and regulation of its uses with built-in guarantees against diversion to third countries without prior U.S. approval, was concluded in April last. The agreement was due to be signed during the visit of the U.S. Commerce Secretary, Mr. Malcolm Baldrige, to Delhi in May before the Prime Minister, Mr. Rajiv Gandhi's visit to Washington.

But as there was a last-minute hitch over the definition of nuclear uses, only the remaining part of the agreement dealing with other categories of technology transfer were included in the agreement signed by the Foreign Secretary, Mr. Romesh Bhandari, on the last day of Mr. Baldrige's visit. The sections dealing with sale of super computers was left open pending a high-level review by the Government of India of the implications of the assurances the U.S. was seeking against the use of this equipment for any nuclear-related purpose.

During the earlier stages of these negotiations, India was prepared to give an undertaking that these super computers would not be used for making nuclear weapons. But the U.S. insisted on blanket assurance that these would not be used for any nuclear purposes, since in its view there was hardly any difference between tests carried out for peaceful or potential military uses.

**Diversion of equipment:** In arriving at the latest understanding, the Government of India has relied partly on the formulations used in the nuclear agreement signed by China with the U.S. providing the necessary guarantees against diversion of equipment to third countries or its use for non-authorised purposes. As the text of the letter containing these assurances, that has been given to the U.S. Government is being kept secret, it is not possible at this stage to ascertain how far India has gone in complying with the U.S. requirements.

There is no basis at all for reports emanating from Washington that this understanding on nuclear uses had been finalised during the recent visit of the Scientific Adviser to the Defence Ministry, Dr. V. S. Arunachalam, to Washington. The necessary policy decision on the kind of assurances to be given was taken in Delhi well before his visit.

**Military supply relationship:** The U.S., which continues to evince interest in the establishment of a military supply relationship with India had, no doubt, taken Dr. Arunachalam and his colleagues to different defence establishments and arms manufacturing plants including some aircraft factories to indicate the wide range of weaponry that could be made available. But so long as the U.S. continues to attach unacceptable conditions and restrict technology transfer for co-production of such weaponry and ammunition, the Government of India would not like to enter into any such arms purchase relationship with it.

CSO: 5150/0071

## BRIEFS

KALPAKKAM REACTOR--Madras, 12 Aug--The 12 MW fast breeder test reactor (FBTR) built at Kalpakkam adjoining the two 235 MY MAPP units is expected to go 'critical' in October this year, Dr. M. R. Srinivasan, Chairman, Nuclear Power Board, told newsmen today at Kalpakkam. The reactor uses a plutonium-uranium carbide fuel unlike the oxide fuel used elsewhere in the world, and because the handling of sodium, the highly volatile coolant, requires new technology, progress had to be made cautiously. Dr. Srinivasan pointed out that it was crucial to the country that the fast breeder technology should succeed for it was the only way the nuclear power programme could make a big contribution to the nation's energy pool. He said that a large number of 500 MW fast breeder reactors would be built during the early part of the next century. The first of the 500 MW type reactors would be set up at Kalpakkam itself, taking advantage of the expertise available in the research establishment there. [Text] [Madras THE HINDU in English 13 Aug 85 p 12]

INDIGENOUS NUCLEAR COMPONENT--Walchandnagar Industries of Bombay has successfully fabricated the shielding flask and skirt assembly, a critical nuclear component, using Advani-Oerlikon's supercito electrode. This component is meant to shield the hazardous radiation emanating from the reactor. The final assembly of the component weighing 50 tonnes had to undergo major manufacturing stages like fabrication of the assembly to the stringent ASME section VIII and filling the sections with lead, the shielding material, to ensure maximum filling efficiency. [Text] [Madras THE HINDU in English 28 Aug 85 p 19]

URANIUM DEPOSITS FOUND--New Delhi (PTI)--The minister of steel, mines and coal, Mr Vasant Sathe, informed the Lok Sabha on Friday that uranium and other heavy minerals had been located in Mehboobnagar, Nalgonda, Bellore and Prakasam districts of Andhra Pradesh. [Text] [Calcutta THE TELEGRAPH in English 24 Aug 85 p 1]

ATOMIC POWER PROJECT--(UNI from Ahmedabad)--A sum of Rs. 64.94 crore would be spent for the Kakrapar atomic power project in Gujarat during the current financial year. So far a total sum of Rs. 107.4 crore had been spent on this Rs. 382.52 crore project. According to official sources, by the end of 1985-86 all main plant civil construction works would be nearing completion and 25 per cent of the work of the entire project would have been completed. [Text] [Bombay THE TIMES OF INDIA in English 30 Aug 85 p 12]

PAKISTAN CHARGE DENIED--New Delhi, Sept 4 (PTI)--India today described as totally baseless the reported allegations made by the Pakistan minister of state for foreign affairs, Mr Zain Noorani, that the Indian Air Force has held special exercises to test its capability to carry and drop nuclear weapons. Mr Noorani is reported to have made the allegation in London in response to a question by a BBC reporter at a press conference on September 2 attended only by Pakistani journalists. The Indian reaction came when newsmen drew the external affairs ministry spokesman's attention to the reported allegation. [Text] [Calcutta THE TELEGRAPH in English 5 Sep 85 p 4]

CSO: 5150/0070

PAKISTAN

## BRIEFS

PUNJAB URANIUM DISCOVERY--Karachi, Aug 24--Exploratory reconnaissance drilling in the environs of Mianwali district in Punjab has confirmed the occurrence of uranium bearing strata lying buried below the present day ground water-table. Extensive drilling at one of the trends has confirmed the presence of a significant ore body of appreciable grade and thickness. The other strata have also been test-drilled and found to host significant uranium occurrences according to a report in "Pak Atom" a publication of Pakistan Atomic Energy Commission (PAEC). The Commission has an extensive program for the exploration and maining of uranium. The success of this program has in no small measure contributed to the safe and continued operation on the Karachi Nuclear Power Plant (KANUPP) on indigenous fuel. [Text] [Karachi DAWN in English 25 Aug 85 p 2 GF]

CSO: 5100/4785

SOUTH AFRICA

'KOEBERG ALERT' CALLS FOR PROBE

Johannesburg BUSINESS DAY in English 16 Sep 85 p 4

[Text] THE anti-nuclear lobby Koeberg Alert has called on Escom to publicly disclose how it could justify the construction of a second nuclear power station.

Koeberg Alert also called for a public inquiry into the cost, safety and environmental impact to determine whether or not Escom should build a second nuclear station.

Escom announced last Thursday it was investigating sites in the Eastern Cape for a second station.

A spokesman for Koeberg Alert, John Venn, said recent events had shown that nuclear power was completely uneconomic in South Africa.

He said Escom admitted last year that electricity from Koeberg cost three times as much as that from coal power stations. It was also likely to be much cheaper to transmit electricity to the Eastern Cape from the Transvaal.

Venn said the construction of a second nuclear power station was unlikely for the following reasons:

- The decline of the rand had made the cost of importing this technology extremely high;
- The recently-imposed ban by the EEC and the United States on the transfer of nuclear technology would for the forseeable future prevent the construction of another power station;
- The lower-than-expected growth in electricity demand would make the expansion unnecessary. — Sapa.

CSO: 5100/48

## RADIATION MONITOR STATIONS INSTALLED

Cape Town THE ARGUS in English 11 Sep 85 p 4

[Text] A R47 000 gamma radiation monitor is being installed on Robben Island tomorrow as part of the city health department's continuing check on the level of radiation from Koeberg nuclear power station.

Six monitors are already in full operation in the city.

They were set up following an Atomic Energy Commission wind study report for Escom six years ago which showed that Cape Town was downwind of Koeberg for about 15 percent of the year, according to Cape Town's Medical Officer of Health, Dr Reg Coogan.

"Radioactive tracer elements released at Koeberg were picked up at a number of points in the Cape Town area, particularly when the wind came from the north and north-east," Dr Coogan said.

### Constant link

"For that reason the city health department decided to set up a series of independent monitors around Cape Town to pick up any increase in radiation which might be caused owing to a release of radioactive material at Koeberg."

Dr Coogan said the monitor on Robben Island was being installed on the particular recommendation of the director of radiation control at Harrisburg, Pennsylvania, whose region included the Three-Mile Island nuclear power station — scene of the world's worst nuclear accident in 1979.

The Robben Island monitor will have a constant radio link with the civil defence control centre in the civic centre.

The link was built by electronics experts in the city electrical engineer's department who worked on the project for two years.

"The monitor is capable of 24-hour-a-day gamma ray radiation monitoring, storing the information on computer, raising the alarm if necessary and also responding to radio queries from the control centre about the possible causes of increased readings," Dr Coogan said.

He said the monitors formed the independent part of his department's three-fold bid to protect the city.

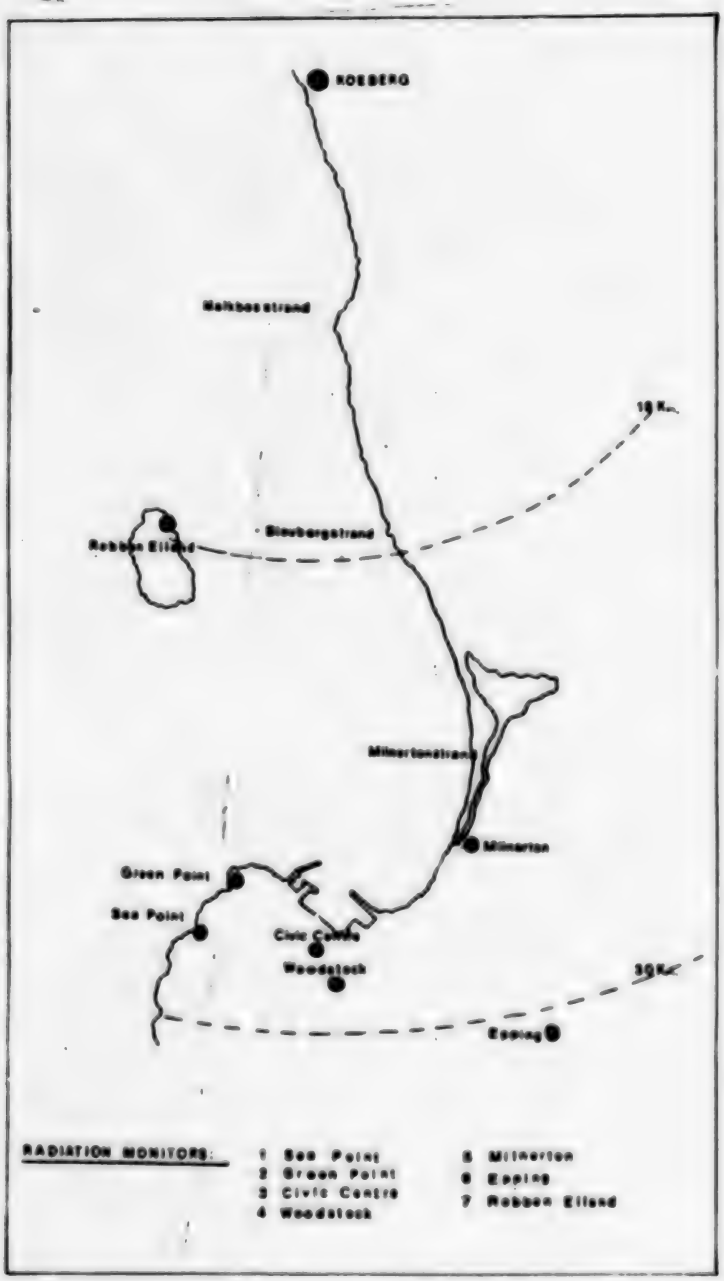
Dr Coogan said this monitoring was "as good as we can do" but he reiterated the warning in his annual report that arrangements for public safety following a nuclear emergency were unacceptable.

Emergency planning should be based on the lessons propounded by the Kemeney commission, which reported to the President of the United States after the Three-Mile Island accident, according to Dr Coogan.

"Some of the sharpest criticism was levelled at the surrounding local authorities who had no emergency plans for an accident at the nuclear station and when an emergency did arise complete confusion and chaos reigned.

"I do not want that that should ever occur in Cape Town," Dr Coogan said.

● The Atomic Energy Commission, responsible for issuing Escom with a licence incorporating emergency planning for Koeberg, has asked for a copy of Dr Coogan's annual report.

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BELGIUM

PLANS TO STORE RADIOACTIVE WASTE UNDERGROUND IN MOL

Brussels LA LIBRE BELGIQUE in French 10-11 Aug 85 p 9

[Article by Louis Willems]

[Text] Beginning in 1992, Belgian radioactive waste will probably be buried 220 meters under the Mol power plant.

Hades was the Greek god of Hell; the Romans called him Pluto. The researchers at the Mol Center for Nuclear Energy Studies, and in particular Mr Bonne, head of the project, preferred the Greek name for their R&D program to store radioactive waste in geological strata, and particularly in the deep clay strata known as Boom clay, which are found at Mol. But HADES in this case stands for High Activity Disposal Experimental Site. This English acronym is a better title for the project, which is concerned with the storage of highly radioactive wastes from irradiated nuclear fuel.

Water

Since the origins of nuclear fission, nuclear scientists and experts have had to face this problem, which they have solved by by simply placing the waste in specially prepared water tanks, because it was the least costly, fastest, and in fact the only immediately available solution. Much later, French researchers perfected the technique of waste vitrification, in which the waste is coated with molten glass, which once cold, is covered with tar, placed in a metal container, and stored in special shafts bored in subsoil granite. This of course applies to highly radioactive waste. Moderately radioactive waste is cast in concrete after cooling, placed in barrels, and then stored in special bunkers with particularly thick walls, or in absolutely stabilized salt mines as in Germany. Weakly radioactive waste is placed in barrels and buried in a deep fault in the Atlantic. Although this practice appears to be harmless to the environment, a trend is emerging to discontinue it for psychological reasons.

## Priorities

Since its foundation in 1950, CEN (Nuclear Studies Center) has been working on the processing and safe management of radioactive wastes as one of its priorities. It rapidly became clear in Belgium that nuclear energy expansion would require the construction of a processing infrastructure and more extensive research and development on behalf of waste producers, whether in the private sector or as radioisotope users. It has been clear since 1979, we are told by Mr Dejongh, deputy director general of CEN, that despite an increasingly strong international collaboration, Belgium had to find a way to store on its own territory, its highly active, plutonium contaminated, packaged waste. A very specific program for geological storage was formulated, taking into account the formations existing in Belgium. An official agency, ONDRA (National Agency for Radioactive Waste and Fissile Materials) was created for waste management. From the beginning as well, the EEC has also shown interest in this research, supporting it with subvention contracts. Since 1983, the R&D program is financed almost exclusively by these contracts, with one share continuing to be carried by the Belgian private sector. Lastly, in 1984, ANDRA, the French agency responsible for radioactive waste management, obtained a scientific participation in the HADES project.

## Feasibility

Laboratory tests and on-site observations have demonstrated the intrinsic safety of the storage concept. This was followed by the construction of an underground laboratory in the clay, about 223 m below Mol's buildings; this construction is now complete, and will be used to perform on-site tests of waste stability, possible water motion, and heat dissipation, to measure the geomechanical properties of the clay formation, and so on. In short, to determine whether burial of highly active wastes with long lifetimes, in deep clay strata, constitutes a safe long term solution. It also remains to be demonstrated whether this solution is technically and economically justifiable. Dozens of drillings and seismic probings have been carried out at the Mol-Dessel site and its surroundings, with the experts drawing positive conclusions.

The construction of the underground laboratory began in 1980 and was completed at the end of last year. CEN now has an exploitation authorization from the Mol commune. The--still experimental--installation consists of a concrete-lined access shaft, 2.65 m in diameter, a central room, a horizontal gallery, and additional small exploration cavities. All of it crammed with analytical instruments which monitor as a function of time, strains and deformations in the installation and in the surrounding earth, as well as geomechanical phenomena and the corrosion of metallic materials in contact with the clay.

These tests will continue the same approach used by the European Commission and by other large nuclear programs being carried out in Switzerland, Sweden, Canada, and the United States. Two stages are planned in Belgium: limited

technical construction and in-situ tests will be conducted during 1985-1986; the second stage, starting in 1987, will bring the construction of a gallery and the installation of experimental devices for burying radioactive materials.

New Perspectives

Significant results are expected from this research. It will bring Belgium to the level of other large industrialized nations which are examining similar solutions. In coming years, the yearly R&D expenses of the European Commission will amount to about 2 billion Belgian francs. This effort will continue until 1992, with the expectation that practically 20 years of EEC research will result in a final industrial scale storage, which would be a magnificent performance, rich in promise for the Belgian industry. It would definitely close the loop in the nuclear fuel cycle, thus eliminating a concern that has existed for almost half a century. But it would especially open new perspectives in areas other than the storage of nuclear waste, such as the storage of heat and toxic waste, tunnel construction in similar formations, or the storage of fuels and liquids in underground structures; these are some of the broadest concerns of the year 2000. Participating in the Mol experiments are interested research agencies in France, Italy, and England, the Louvain Catholic University, the National Institute for Extractive Industries (Liege), the Geologic Department (Brussels), the Joint Research Center of the European Commission (ISPRA), the Forakry Drilling Company (Brussels), the Tractional Studies Bureau, and so on, thus amply illustrating the economic interest of the project.

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